

EXHIBIT A

CERTIFICATION

File No. 4465-II-22.763

DE 101 63 985.6

**Title: "Copolymers Containing Aminoplast Units and their Use as
Dispersants or Stabilizers"**

We hereby certify that the following is, to the best of our knowledge and belief, a true, complete and accurate English-language translation of DE 101 63 985.6 as originally filed in German language.

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PATENT APPLICATIONCopolymers containing aminoplast units and their use as
dispersants or stabilizers

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Description

The invention relates to innovative aminoplast ether
copolymers, to a process for preparing them and to
15 their use as dispersants or stabilizers.

The aminoplast units normally employed as crosslinking
agents in the curing of paints and varnishes or
polymers can be used for linking chemically different
structures. Thus is it possible to prepare correspond-
20 ing products containing alkyl, ether, ester, amine or
urethane groups.

According to Römpp Lexikon: Lacke und Druckfarben,
Georg Thieme Verlag, 1998, dispersants are surface-
active substances which facilitate the dispersing of a
25 pulverulent substance, e.g., a pigment or filler, in a
liquid dispersing medium by lowering the surface
tension between the two components. Dispersants
facilitate the mechanical disruption of agglomerates
into primary particles. Additionally dispersants
30 protect the primary particles formed, by forming a
protective colloid shell or an electrochemical bilayer,
against reagglomeration or flocculation. Where measures
against flocculation or against sedimentation are taken
deliberately that lead to steric and/or electrostatic
35 stabilization of the pigment particles with one

- another, the term "stabilizers" is used. Stabilized pigments exhibit a lesser propensity to settle. In the preparation of paints and varnishes, dispersants facilitate the incorporation of pigments and fillers, which as important formulating constituents determine the visual appearance and the physicochemical properties of coatings. Moreover, dispersants may increase the compatibility between chemically different polymer types.
- US-A-5,629,373 describes the use of water-soluble graft polymers as associative thickeners.
- Dispersants for pigments and pigment compositions comprising them are described for example in DE 199 04 603 A1, DE 198 36 253 C1, DE 199 05 269 A1, WO 97/26984 and EP-A-0 879 860.
- In accordance with the state of the art the stabilization of pigment dispersions and filler dispersions is essentially achieved by steric hindrance in solventborne systems and predominantly electrochemical in aqueous systems. In aqueous systems in particular it is possible, in the course of preparation and processing, for numerous problems to occur, which are described in Juan M. Oyarzún, Handbuch der Pigmentverarbeitung, Vincentz-Verlag, 1998:
- difficulty of pigment incorporation, or wetting
 - deterioration in rheological properties
 - sedimentation
 - pigment floating
 - low compatibility with various binders
 - deficient hydrolysis resistance
 - adequate activity only with large amounts added

- low gloss, low hiding power, inadequate color strength
- poorly reproducible shades.

Normally use is made of anionic, cationic, nonionic or amphoteric dispersants, if desired in polymeric form. In aqueous systems in particular additives are used that are based on mineral oils, polyacrylates, modified silicones and alkylphenol ethoxylates. Mineral oils, however, lower the gloss and the transparency of the coating and tend toward separation in systems with low levels of pigmentation. Disadvantages of modified natural materials include their low water resistance and biostability. The polyacrylates that are in the foreground at present, in some cases adversely affect the water resistance, gloss and transparency. The use of alkylphenol ethoxylates is objectionable from an ecotoxicological standpoint, while silicones in some cases exhibit interadhesion problems and cratering problems (Schmitz et al., Farbe&Lacke, 3/2000).

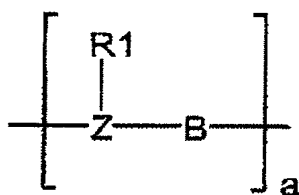
Improvement to the prior art dispersants is also required in respect of their universal usefulness, such as, for example, the compatibility with modern aqueous binder systems (readily miscible, flocculation stability).

It was an object of the present invention to overcome the aforementioned disadvantages of the prior art and to provide novel dispersants and stabilizers which are easy to prepare and which in aqueous systems in particular exhibit extremely good performance properties. It is intended that a positive influence be exerted on the viscosity stability of pastes, the avoidance of flocculation and aggregation, the color strength and the water resistance of the coatings

prepared therefrom. Furthermore, products ought to be used that contain no cosolvents and can be employed universally.

Surprisingly it has been found that this object is achieved by means of water-soluble aminoplast ether copolymers according to claim 1.

Such aminoplast ether copolymers are of the following structural type:



where

Z is an aminoplast unit based on a glycoluril which is unsubstituted or substituted.

All aminoplast units comprise as a reactive group the OR-group, e.g. alkylol, alkyleneol, alkylol ether, alkylol ester. Particularly preferred is the methoxy group;

B is an organic compound containing at least two functional groups comprising active hydrogen, that may react with the OR-function of the aminoplast unit, preferably with a hydroxyl group;

R1 is an organic compound containing at least one functional group which is able to react with the OR function of the aminoplast unit to form an ether bond, preferably having a hydroxyl function, and

a is at least 1.

According to a preferred embodiment of the invention, B is polytetrahydrofuran, poly-n-butyl acrylate, poly-n-butyl methacrylate, polyethyl acrylate, polyethyl methacrylate, polymethyl acrylate, polymethyl methacrylate, a predominantly aliphatic polycarbonate or a predominantly aromatic polycarbonate, and more preferably a poly-n-butyl methacrylate or a predominantly aliphatic or aromatic polycarbonate

According to one particularly preferred embodiment of the invention, R1 is methylcellulose, polyacrylic acid, polymethacrylic acid, ethylene/acrylic acid/sodium acrylate copolymer, polyalkylglycol, polyvinyl alcohols or polyvinylpyrrolidone, preferably a methoxy-terminated polyalkylglycol.

Particularly preferred Z is glucoluril, B is hydrophobic and/or R1 is hydrophilic.

The index a can be from 1 to ∞ . In general the average molar mass of dispersants is from 1 000 to 100 000, preferably from 2 000 to 50 000, more preferably from 2 500 to 40 000. As already mentioned, the copolymers of the invention are preferably predominantly linear.

R1 (side chains of the copolymer) preferably has an average molar mass of from about 500 to 30 000 g/mol, in particular from about 1 000 to 20 000 g/mol, more preferably from about 1 500 to 10 000 g/mol, particularly preferred from about 1 500 to 8 000 g/mol.

B preferably has a molar mass of from about 100 to 30 000 g/mol, in particular from about 200 to 20 000 g/mol, more preferably from about 300 to 10 000 g/mol, particularly preferred from 300 to 7 000 g/mol.

Additionally the overall molar mass of the aminoplast ether copolymers of the invention is preferably between about 1 000 and 100 000 g/mol, in particular between about 2 000 and 50 000 g/mol, more preferably between
5 about 2 500 and 40 000 g/mol.

Examples of graft copolymers of the invention are depicted in fig. 2.

The copolymers of the invention can be prepared by known methods, e.g., in accordance with US 5,914,373 in
10 from 10% to 60% strength solution of an alkylated benzene (toluene or xylene).

According to a preferred embodiment, the reaction is performed in from 15% to 35% strength solution, in particular in from 20% to 30% strength solution, at
15 temperatures from about 70°C to 130°C to obtain copolymers according to the invention. The reaction time influences the conversion rate of the reaction. The conversion rate determines the molar mass obtainable for copolymers according to the invention.
20 According to one preferred embodiment of the invention a neutralizing agent, an amine for example, is added after a reaction time of from 2 to 6 h, preferably from about 2.5 to 5 h, to give molar masses of the copolymers advantageous for an application as
25 dispersant.

The production of analogous aminoplast systems is also described in DE 100 38 147 of the same applicant, as well as in US 5,627,232, both incorporated herewith into the description by reference, wherein
30 polyfunctional aminoplast units Z react with mono- and polyfunctional organic compounds (R1 and B) with acid catalysis.

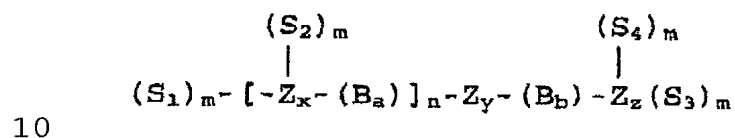
Surprisingly, it has been found that the desired copolymers can be prepared in an analogous manner by means of a one-pot reaction. For that purpose, the reactants are reacted at temperatures of 60 to 140 °C, preferably 70 to 120 °C in solution or without solvent (in bulk). In general, residues of water are removed with an inert solvent, such as toluene or xylene, for example, or by applying reduced pressure. In order to remove the low molecular mass condensation product formed during the reaction more easily (e.g., methanol, butanol), it is advisable to add an inert solvent, such as toluene, xylene or a petroleum fraction, or else to evacuate. As initiator it is usual to add acids, e.g., sulfonic acids. The optimum amount for addition is between about 0.2% and 10% by weight, preferably between about 0.2% and 7.0% by weight, based on the sum of the functional monomers. The reaction is carried out under reduced pressure, and when working with solvent the solvent removed by azeotropic distillation is continually replaced with fresh solvent.

The molar ratio B:Z is preferably between about 0.25:1 and 4:1. The molar ratio Z:R1 is preferably between about 1:0.25 and 1:4. The progress of the reaction can be ascertained by determining the viscosity or by determining the amount of low molecular mass condensation product. The products of the reaction are liquid or thermoplastic and water-soluble or water-dispersible.

One further aspect of the present invention relates to the provision of dispersants and stabilizers for pigments or fillers. Thus, it has surprisingly been found that for this purpose the aminoplast ether copolymers of the invention, in which Z is a glycoluril

and B, R1 and a are as defined above, exhibit unexpectedly good properties. The aminoplast ether copolymers of the invention used with preference are preferably water-soluble and can be employed with particular advantage in aqueous systems.

Additionally, it has surprisingly been found that the graft polymers or graft copolymers of the somewhat more general formula below also constitute advantageous dispersants and stabilizers for pigments or fillers:



in which (Ba) to (Bb) are base polymer chains which are identical or different from one another and which optionally have free valences for the formation of a crosslinked structure; Zx to Zz are central units which are identical or different from one another and which optionally have free valences for the formation of a crosslinked structure; (S1) to (S4) are polar or apolar side chains which are identical or different from one another; m = 1 to 100, preferably 2 to 50, in particular 2 to 20, and n is an integer from 0 to 500, preferably 1 to 100, in particular 1 to 50, and the structure is completed by any end groups.

Graft polymers and/or graft copolymers of this kind are also described in DE-A-100 38 147 of the same applicant, the disclosure content of which in this respect is also adopted into the present description by express reference.

It is has surprisingly been found that particularly good dispersants, in particular for aqueous systems,

are obtained if m is 11 to 100, in particular 12 to 50 and more preferably 12 to 20.

The main chain of the graft polymer or copolymer is essentially a linear molecule. This molecule is
5 produced by subjecting at least one difunctional molecule to addition polymerization or polycondensation, e.g., a diisocyanate, a diester, a dicarboxylic acid, a dicarboxylic anhydride, a diol, a lactone, a lactam, or another difunctional compound
10 from the group of the silanes or siloxanes.

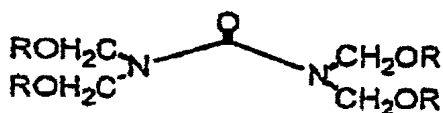
In the simplest case the "side chains" are the different terminal groups (terminating end groups). In the case of graft polymers or copolymers having a very high molecular weight, however, modification via the
15 end groups is not enough to effect substantial change in the molecular properties of these products. Such change can be expected only at relatively low molar weights, from 10 000 to 100 000 Dalton, for example. In the case of higher molar mass graft polymers or
20 copolymers it is necessary to insert functional groups. The graft polymers or copolymers can be prepared conventionally, e.g., in solvents, in water or by direct reaction of the "building blocks" with or without the aid of a catalyst.

25 Appropriate selection of the side chains enables the resulting HLB (hydrophilic/lipophilic balance) to be tailored. If the medium for which the innovative graft copolymer is prepared is predominantly hydrophilic then the base polymer will likewise be selected from the
30 class of predominantly hydrophilic polymers (e.g., polyethylene glycol (PEG) in Example B of US-A-5,267,232).

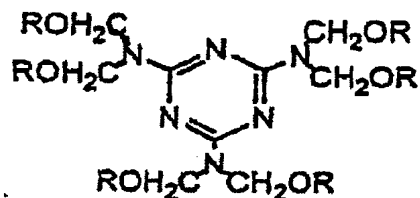
If, however, the field of use is an entirely apolar medium, such as a polyethylene or polypropylene, for example, then a predominantly apolar base polymer is used, e.g., a long-chain and terminal diol or a
 5 polyethylene wax containing terminal OH groups.

For partly hydrophilic and hydrophobic systems it is also possible to use a correspondingly adapted base polymer based on polyethylene glycol, polypropylene glycol, polytetrahydrofuran or combinations and/or
 10 block polymers thereof, the corresponding polarities being introduced by way of the base polymer.

The aminoplast central unit is preferably composed of monomers of the formulae

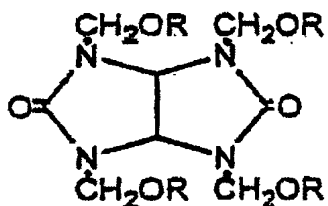


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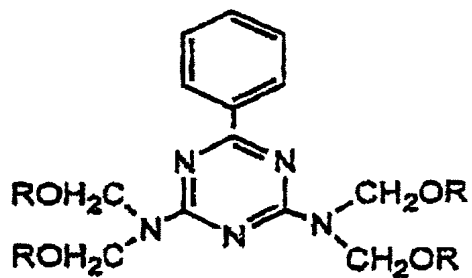


15 urea-formaldehyde

melamine-formaldehyde



or



glycoluril

benzoguanamine

in which R is a lower alkyl group, preferably a methyl or ethyl group.

The base polymer chain (Ba) to (Bc) is preferably a polyalkylene moiety, e.g., a polyethylene or polypropylene moiety; a polyoxyalkylene moiety, e.g., a polyoxyethylene or a polyoxy(ethylene-butylene) moiety;
5 a polyurethane moiety, a polyoxyacrylate or polyoxymethacrylate moiety, a polycarbonate moiety and/or a polysiloxane moiety.

In the graft polymers or copolymers of the invention the side groups (S₁) to (S₃) can be selected from hydrophobic and/or hydrophilic side groups, particularly
10 from unilaterally alkyl-terminated polyethylene/polypropylene copolymers, saturated or unsaturated C₉-C₃₆ alkyl ethoxylates, CH₃-O-[CH₂-CH₂-O]_pH, alk-O-[CH(CH₃)CH₂O]_pH, or CH₃-(CH₂)_nCH=CH-(CH₂)_m-CH₂OH (n, m, p
15 = 1 to 500). These side groups can also be used as R₁.

Preferably in the graft polymers or copolymers n is an integer from 1 to 500, in particular from 1 to 100, e.g., from 1 to 50.

In the graft polymers or copolymers of the invention
20 the base polymer chains (B_a) to (B_b) can be substantially polar and the side chains (S₁) to (S₄) substantially apolar, or vice versa. Additionally the graft polymers or copolymers of the invention can be in solid or liquid form and can have the molar mass
25 indicated above for the aminoplast ether copolymers of the invention.

The aminoplast-based copolymers of the invention are surprisingly highly suitable, as mentioned above, as dispersants and/or stabilizers for pigments and/or
30 fillers, and also in particular for preparing pigment concentrates for aqueous systems. In this context the dispersant and/or stabilizer is homogenized together

with the pigments and/or fillers to be dispersed, optionally in the presence of organic solvents and/or water, optionally with binders and optionally with customary coatings auxiliaries. The above-described copolymers may also be used for preparing a coating composition, in which case a binder, optionally a solvent, pigments and/or fillers, the copolymer and optionally auxiliaries are dispersed together. The copolymers of the invention according to claim 1 provide an innovative class of dispersants having unexpectedly good properties for aqueous systems.

For the preparation of aqueous pigment pastes according to one preferred embodiment from 0.1% to 100% by weight of the copolymers of the invention, preferably from 0.2% to 80% by weight (based on the weight of the pigments). This, however, is dependent on the surface area to be covered on the solid to be covered. Carbon black requires very much more dispersant than, for example, TiO_2 . It is possible, that beyond 100 parts by weight are used. The dispersants are generally applied to the solids in the presence of solvents and/or water. Alternatively, they may be applied directly to the solids that are to be dispersed. For that purpose, the copolymers can be mixed with the pigments to be dispersed or dissolved directly the dispersing medium (water, optionally additions of glycol ether) prior to or simultaneous with the addition of the pigments and, where used, other solids.

The dispersants or stabilizers of the invention are particularly suitable for preparing pigment concentrates. Aqueous, highly concentrated, pumpable and flowable pigment preparations can be prepared in a simple way by dissolving the copolymer of the invention

in water, together, if desired, with a further component, adding the pigment with stirring, and dispersing the mixture until the desired fineness and consistency is achieved. Another method consists in
5 mixing a pigment or filler with the copolymer of the invention; the mixture can be dispersed in water, if necessary. Furthermore, an aqueously moist pigment filtercake can be admixed with the copolymer of the invention and incorporated into the pigment filtercake
10 using a dissolver, for example.

The dispersants or stabilizers of the invention can be used for any desired pigments and fillers. Examples of pigments to be dispersed are familiar to the skilled worker and are disclosed for example in DE 199 04 603
15 A1 on pages 6 and 7, hereby explicitly incorporated by reference. The solids (fillers) to be dispersed for which the copolymers of the invention can be used include - without being restricted to - the organic and inorganic pigments that are known to the skilled
20 worker, which can be found both in Pigment Handbook, Vols. 1-3, John Wiley & Sons, New York, 1988 and in Ullmann's Encyclopedia of Industrial Chemistry, Volume 5, Vol. 20.

The invention is now illustrated with reference to the
25 following, non-limiting examples; in the drawings

fig. 1 shows examples of aminoplast central units (Z);

fig. 2 shows preferred copolymers according to claim 1, where b, c, d and e are any integer, preferably from 1 to 100, in particular from 1 to 50, and e is preferably
30 defined like a (cf. above).

Preparation examples

Example 1 (in solution)

A reaction vessel is charged with 17 g of PolyTHF 2900 (BASF), 3.73 g of Powderlink 1174; Cytec, 87.93 g of polyglycol M 5000 S (Clariant) and 400 ml of toluene, this initial charge is heated to 135°C under nitrogen and traces of moisture are removed by azeotropic distillation. After 1 hour the reaction is initiated by adding 0.48 g of Nacure 5076 (70% dodecylbenzenesulfonic acid in isopropanol, Worlee) under a vacuum of 530 mbar and continuous dropwise addition of fresh toluene. The course of the reaction can be monitored by gas chromatography analysis of the distillate for the amount of methanol it contains. After a reaction time of approximately 5 hours the conversion is quantitative and the reaction is halted by adding 0.31 g of triethanolamine (Acros). Reaction is allowed to continue for 10 minutes under nitrogen, the clear, viscous solution is poured into trays and the product is dried to constant mass in a vacuum drying oven at 60°C. Analysis of the polymer obtained by gel chromatography indicates an M_n value of 19 100 (calibration against polystyrene/THF) with an M_n/M_w ratio of 1.42. Evaluation of the peak area of the monomer indicated a residual monomer content of 10%.

Example 2 (in bulk)

A sigma mixer is charged with 1700 g of PolyTHF 2900 (BASF), 373 g of Powderlink 1174 (Cytec) and 8793 g of polyglycol M 5000 S (Clariant). The reactants are dried at 105°C and a vacuum of 40 mbar with stirring at 30 rpm for about 3 hours until gas is no longer evolved. The vacuum is broken with nitrogen and the

reaction is initiated by adding 48 g of Nacure 5076 (70% dodecylbenzenesulfonic acid in isopropanol, Worlee). Kneading is carried out under vacuum at 30 rpm. After a reaction time of approximately 1.5 hours the reaction mixture becomes highly viscous. By adding 31 g of triethanolamine (Acros) and 1 g of 2,6-di-tert-butyl-4-methylphenol (antioxidant) the reaction is halted under nitrogen. The product is waxlike and soluble in water. The reaction time is important for the product properties, with reaction times of from about 2 to 10 hours, in particular from 2.5 to 8 hours, being preferred for products having molar masses of from 2 500 to 40 000.

Examples 3 to 16

Further copolymers were prepared in accordance with Example 1, varying the stoichiometry and the chemical structure of the bifunctional or monofunctional organic compounds. The individual compositions are specified in Table I, the abbreviations used being as follows:

THF: PolyTHF 2900 (BASF)
BA: Diol BD-1000 (Tego)
MMA: Diol MD-1000 (Tego)
PC: Desmophen C 200 (Bayer)
PPG: Pluriol P 4000 (BASF)
PEG: Polyglycol 4000 S (Clariant)
MPEG: Polyglycol M 5000 S (Clariant)
MPEG2: Polyglycol M 2000 S (Clariant)
HEEU: Polymer 1266 (Sartomer)
DMP: Dimethoxypropionic acid (Fluka)

Example	Organic compound B [mol]	Organic compound R1 [mol]	Powderlink 1174 [mol]	Initiator [mol]
1	THF 0.006	MPEG 0.018	0.012	0.0015
2	BA 0.010	MPEG 0.030	0.020	0.003
3	MMA 0.010	MPEG 0.030	0.020	0.003
4	PC 0.006	MPEG 0.018	0.012	0.002
5	PPG 0.015	MPEG 0.023 HEEU 0.023	0.030	0.007
6	PEG 0.015	MPEG 0.023 HEEU 0.023	0.030	0.007
7	THF 0.014	MPEG 2 0.041	0.028	0.0012
8	BA 0.010	MPEG 2 0.030	0.020	0.0014
9	MMA 0.023	MPEG 2 0.070	0.043	0.007
10	PC 0.015	MPEG 2 0.045	0.030	0.003
11	PPG 0.015	MPEG 2 0.023 HEEU 0.023	0.030	0.004
12	PEG 0.015	MPEG 2 0.023 HEEU 0.023	0.03	0.004
13		MPEG 0.023 HEEU 0.023	0.023	0.0024
14	BA 0.020	MPEG 0.020	0.020	0.0024
15	PC 0.020	MPEG 0.020	0.020	0.0024
16	BA 0.020 DMP 0.020	MPEG 2 0.060	0.080	0.0030

The reaction time is between about 2 and about 7 hours to obtain the desired mean total molar mass.

Use examples

5

Example 17 (pigment paste)

To assess the compounds of the invention, pigment concentrates were prepared without additional binder and an evaluation was made of their viscosity, which is a measure of the dispersibility of a solid. To prepare

the pigment pastes, the copolymers of the invention (ex. 1 to 16) are initially dissolved at 20% strength in water, the solutions are mixed with water and auxiliaries and the pigments are added. Dispersing takes place following the addition of grinding media (70 g of glass beads of 2 to 3 mm) in a Dispermat with a single Teflon disc at 8000 rpm for 20 minutes with water cooling. This gives flowable pigment pastes, which were added to a white paint (Aldehyde basis, Akros). The test formulations were drawn down and assessed by the rub-out test. Additionally, the compatibility of the compounds of the invention with binders was tested. For that purpose, 5% of additive (20% strength in water) were stirred into the binder dispersion using a dissolver (level 1 - 2) and the resulting systems were applied and inspected visually.

The viscosity of the pigment pastes was measured using the Bohlin CS viscometer (Bohlin Instruments); colorimetry was carried out with the TCS instrument from BYK Gardner. The comparative additive used was Disperbyk 190 (BYK Chemie).

Formulation of the white paste

70.0	titanium dioxide 2310 (Kronos)
8.8	additive solution, 40% strength
1.0	defoamer
15.8	water

Formulation of the blue paste (amounts in weight-%)

29.2	Heliogen Blue L 7072 D (BASF)
29.2	additive solution, 40% strength or
58.4	additive solution, 20% strength
5	0.8 defoamer (e.g., BYK 024, BYK Chemie)
	0.3 preservative (e.g., Acticide SPX, Thor)
40.5	or 11.3 water

Test paint

Ready-mixed white paint (aldehyde paint, Akzo)

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Results

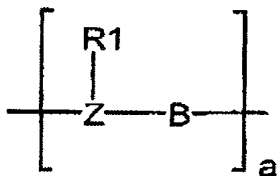
Paste viscosity (mPa) at rotational speed D [s^{-1}]				
Pigment	Example	D=10 [s^{-1}]	D=100 [s^{-1}]	D=1000 [s^{-1}]
Kronos 2310	Comparative	426	191	98
	2	810	416	161
	4	1629	850	344
	8	1007	551	151
	14	532	204	102
Heliogen Blue L7072 D after 24 h	Comparative	726	189	64
	2	397	255	154
	4	979	486	204
	8	50	42	35
	14	2998	892	293
Heliogen Blue L7072 D after 4 weeks/40°C	Comparative	542	156	69
	2	332	218	139
	4	781	403	205
	8	sediment	-	-
	14	2376	771	273

Colorimetry of the pigment concentrate/white paint blend			
	Example	Lightness L	Delta E after rub-out
Heliogen Blue L7072 D	Comparative	80.2	9.6
	2	79.3	8.3
	4	76.7	0.5
	8	78.8	5.3
	14	79.3	7.6

Compatibility with binder (5% dispersant)				
Example	PVA (Mowolith LDM1871)	PU (Alberdingk U 610)	AC (Neocryl XK-90)	SA (Acronal S 559)
Comparative	moderate	good	good	moderate
2	good	good	good	good
4	good	good	good	good
8	moderate	good	good	moderate
12	good	good	good	good

Claims

1. Aminoplast ether copolymers of the following structural type:



5 where

Z is an aminoplast unit based on a glycoluril,

10 B is an organic compound having at least two functional groups which are able to react with the OR function of the aminoplast unit, preferably having a hydroxyl function;

15 R1 is an organic compound containing at least one functional group which is able to react with the OR function of the aminoplast unit to form an ether bond, preferably having a hydroxyl function, and

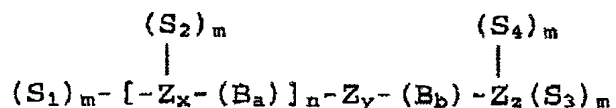
a is at least 1.

2. Aminoplast ether copolymers according to claim 1 characterized in that B is a polytetrahydrofuran, a poly-n-butyl acrylate, a poly-n-butyl methacrylate, a polyethyl acrylate, a polyethyl methacrylate, polymethyl acrylate, a polymethyl methacrylate, a predominantly aliphatic polycarbonate or a predominantly aromatic polycarbonate, and more preferably a poly-n-butyl methacrylate or a predominantly aliphatic or aromatic polycarbonate.
- 20
- 25

3. Aminoplast ether copolymers of claim 1, characterized in that B is hydrophobic.
4. Aminoplast ether copolymers of one of the preceding claims characterized in that R1 is hydrophilic.
5. Aminoplast ether copolymers of one of the preceding claims, characterized in that R1 is methylcellulose, polyacrylic acid, polymethacrylic acid, ethylene/acrylic acid/sodium acrylate copolymer, polyalkylglycol, polyvinyl alcohols or polyvinylpyrrolidone, preferably a methoxy-terminated polyalkylglycol.
6. Aminoplast ether copolymers of one of the preceding claims, characterized in that at least one side chain R1 is water-soluble and connected via an ether bridge to the central unit Z.
7. Aminoplast ether copolymers of one of the preceding claims, characterized in that the reactive OR group is selected from the group of alkylol, alkyleneol, alkylol ether and/or alkylol ester.
8. Aminoplast ether copolymers of one of the preceding claims, characterized in that the reactive OR group is a methoxy group.
9. Aminoplast ether copolymers of one of the preceding claims, characterized in that R1 has a molar mass of from about 500 to 30 000 g/mol, in particular from about 1 000 to 20 000 g/mol, more preferably from about 1 500 to 10 000 g/mol, particularly preferred from about 1 500 to 8 000 g/mol.

10. Aminoplast ether copolymers of one of the preceding claims, characterized in that their molar mass is from about 1 000 to 100 000 g/mol, in particular from about 2 000 to 50 000 g/mol, more preferably from about 2 500 to 40 000 g/mol.
11. A process for preparing an aminoplast ether copolymer of one of claims 1 to 10, characterized in that the aminoplast unit Z is reacted with the organic compounds B and R1 as defined in one of claims 1 to 10 and/or with prepolymers formed therefrom under acidic catalysis in solution or without solvent, preferably in a one-pot process.
12. The process according to claim 11, characterized in that the reaction is carried out in a one-pot process in from 15% to 35% strength solution in respect of monomers used (total reactants), in particular in from 20% to 30% strength solution at 70 to 130°C, and after a reaction time of from about 2 to 10 h, preferably from 2.5 to 8 h, a neutralizing agent, e.g. an amine, is added in order to obtain molar masses of the copolymers of from about 2 000 to 50 000 g/mol, more preferably from about 2 500 to 40 000 g/mol.
13. Aminoplast ether copolymers obtainable by the process according to claim 11 or 12.
14. Use of an aminoplast ether copolymer of one of claims 1 to 10 or prepared according to claim 11 or 12 as dispersant or stabilizer for pigments or fillers.
15. The use of claim 14, characterized in that the dispersant or stabilizer is used in aqueous systems.

16. Use of an aminoplast ether copolymer of one of claims 1 to 10 or prepared according to claim 11 or 12 for the viscosity stability of pigment pastes, for avoiding flocculation and aggregation, for increasing the color strength and/or for improving the water resistance of the coating produced from the paste.
17. The use of one of claims 14 to 16, characterized in that the aminoplast ether copolymer is used in paints or varnishes.
18. The use of one of claims 14 to 17 for preparing pigment concentrates.
19. The use of claim 17, wherein the aminoplast ether copolymer is homogenized together with the pigments and/or fillers to be dispersed, optionally in the presence of organic solvents and/or water, optionally with binders and optionally with customary coatings auxiliaries.
20. The use of one of claims 14 to 19 for preparing a coating composition, for which a binder, optionally a solvent, pigments and/or fillers, the aminoplast ether copolymer and optionally auxiliaries are dispersed together.
21. Use of a water-soluble graft polymer or graft copolymer of the structural type



in which (B_a) to (B_b) are base polymer chains which are identical or different from one another

and which optionally have free valences for the formation of a crosslinked structure; Z_x to Z_z are central units which are identical or different from one another and which optionally have free valences for the formation of a crosslinked structure; (S_1) to (S_4) are polar or apolar side chains which are identical or different from one another; $m = 1$ to 100 , preferably 2 to 50 , in particular 2 to 20 , and n is an integer from 0 to 500 , and the structure is completed by any end groups, as a dispersant or stabilizer for pigments or fillers, for the viscosity stability of pigment pastes, for avoiding flocculation and aggregation, and/or for increasing the color strength and also the water resistance of the coating produced from the paste.

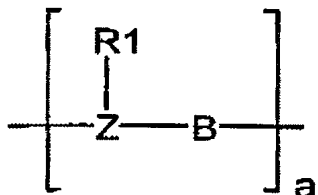
22. A pigment paste comprising an aminoplast ether copolymer of one of claims 1 to 10, prepared according to claim 11 or 12, or a graft polymer or graft copolymer, as defined in claim 21.

23. The pigment paste of claim 20, further comprising a solvent, in particular water, and, if desired, a cosolvent and a defoamer.

24. The pigment paste of claim 20 or 21, characterized in that other than the aminoplast ether copolymer of one of claims 1 to 10, prepared according to claim 11 or 12, or the graft polymer or graft copolymer, as defined in claim 21, there is essentially no other dispersant present.

Abstract

A description is given of aminoplast ether copolymers of the following structural type:



where

Z is an aminoplast unit based on a glycoluril,

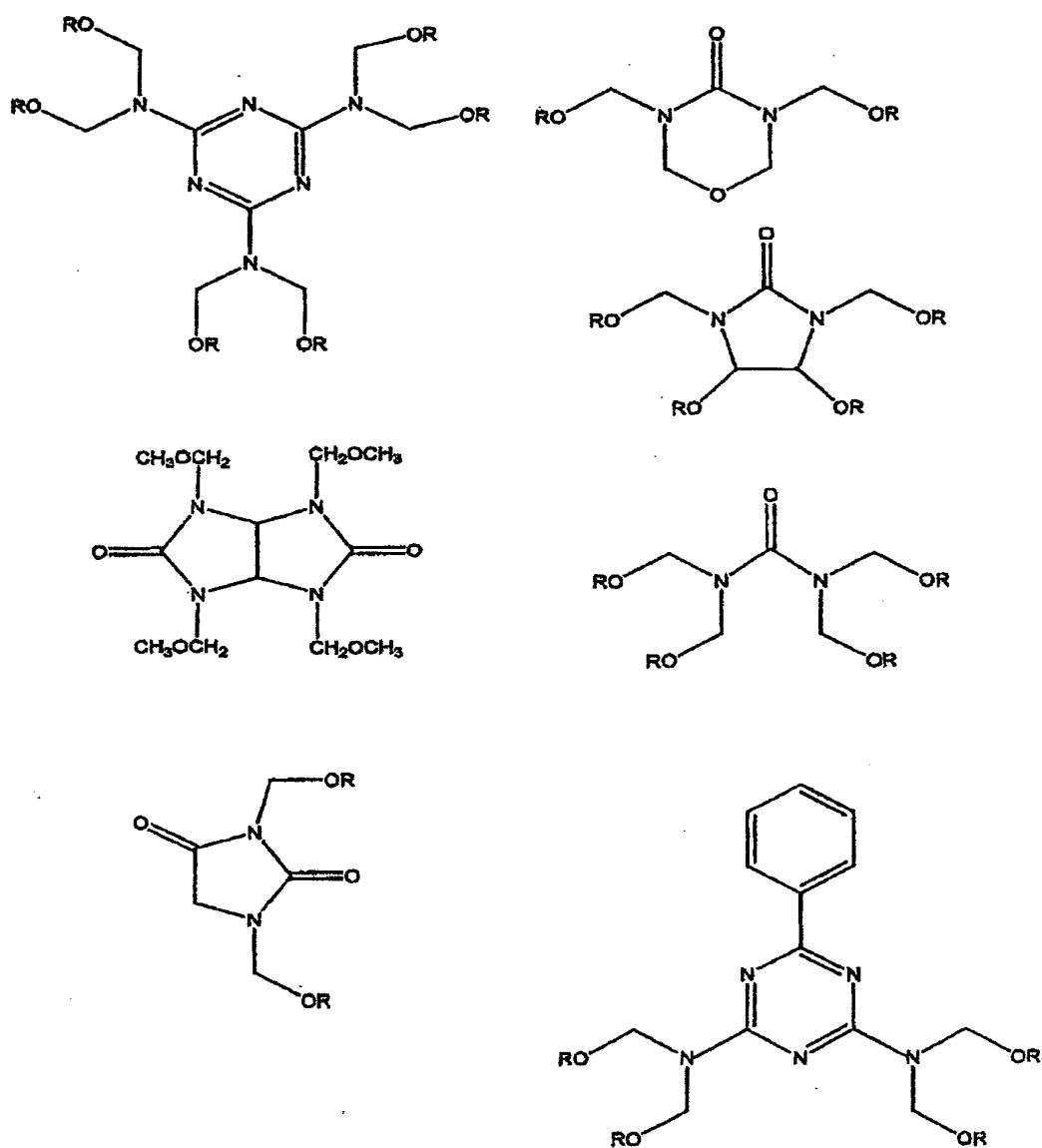
B is an organic compound having at least two functional groups which are able to react with the OR function of the aminoplast unit, preferably having a hydroxyl function;

R1 is the radical of a hydrophilic organic compound containing at least one functional group which is able to react with the OR function of the aminoplast unit to form an ether bond, preferably with a hydroxyl function; and

a is at least 1;

A description is additionally given of a process for preparing the above aminoplast ether copolymers and also of their use as dispersants and stabilizers.

Fig. 1



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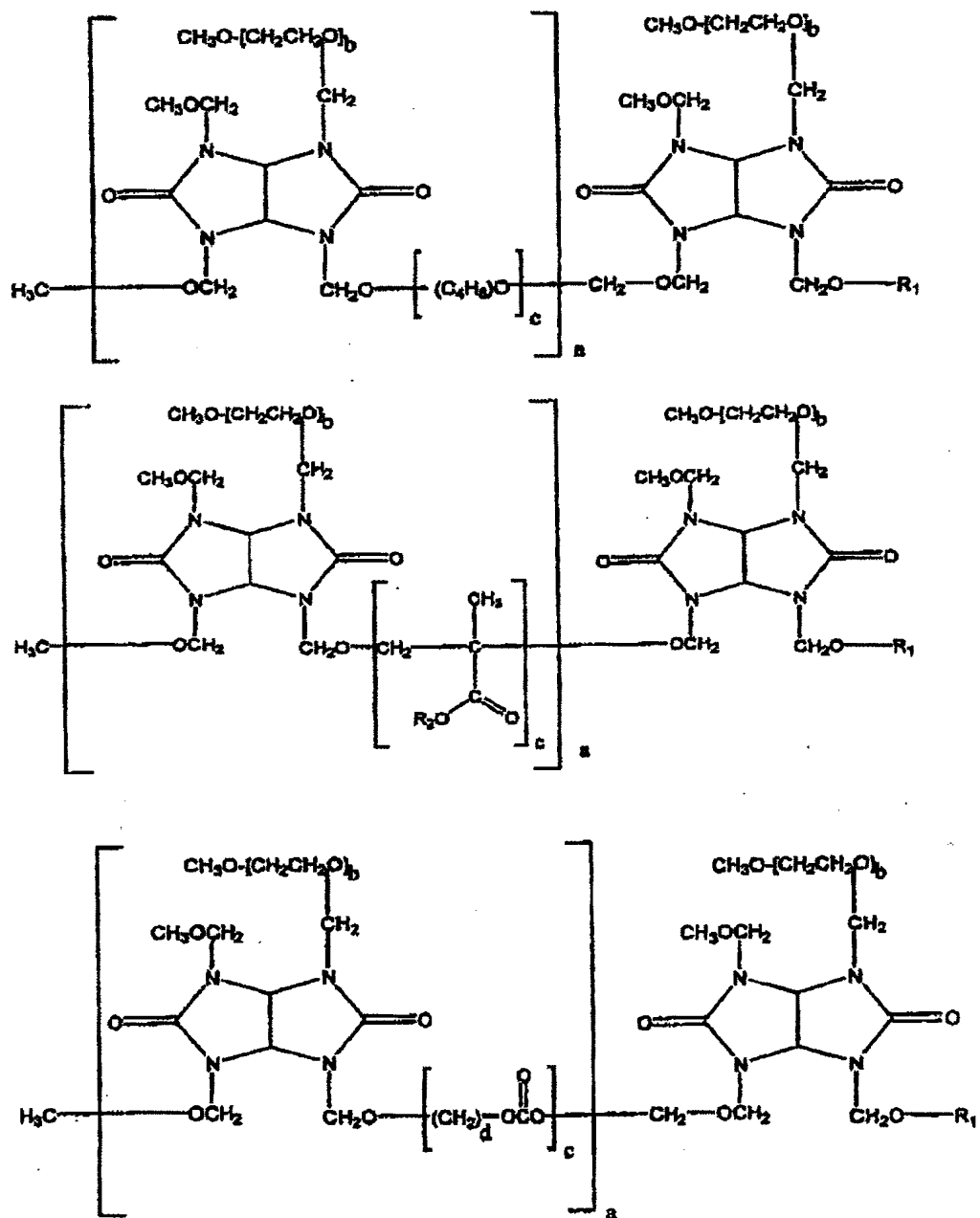


Fig. 2.2

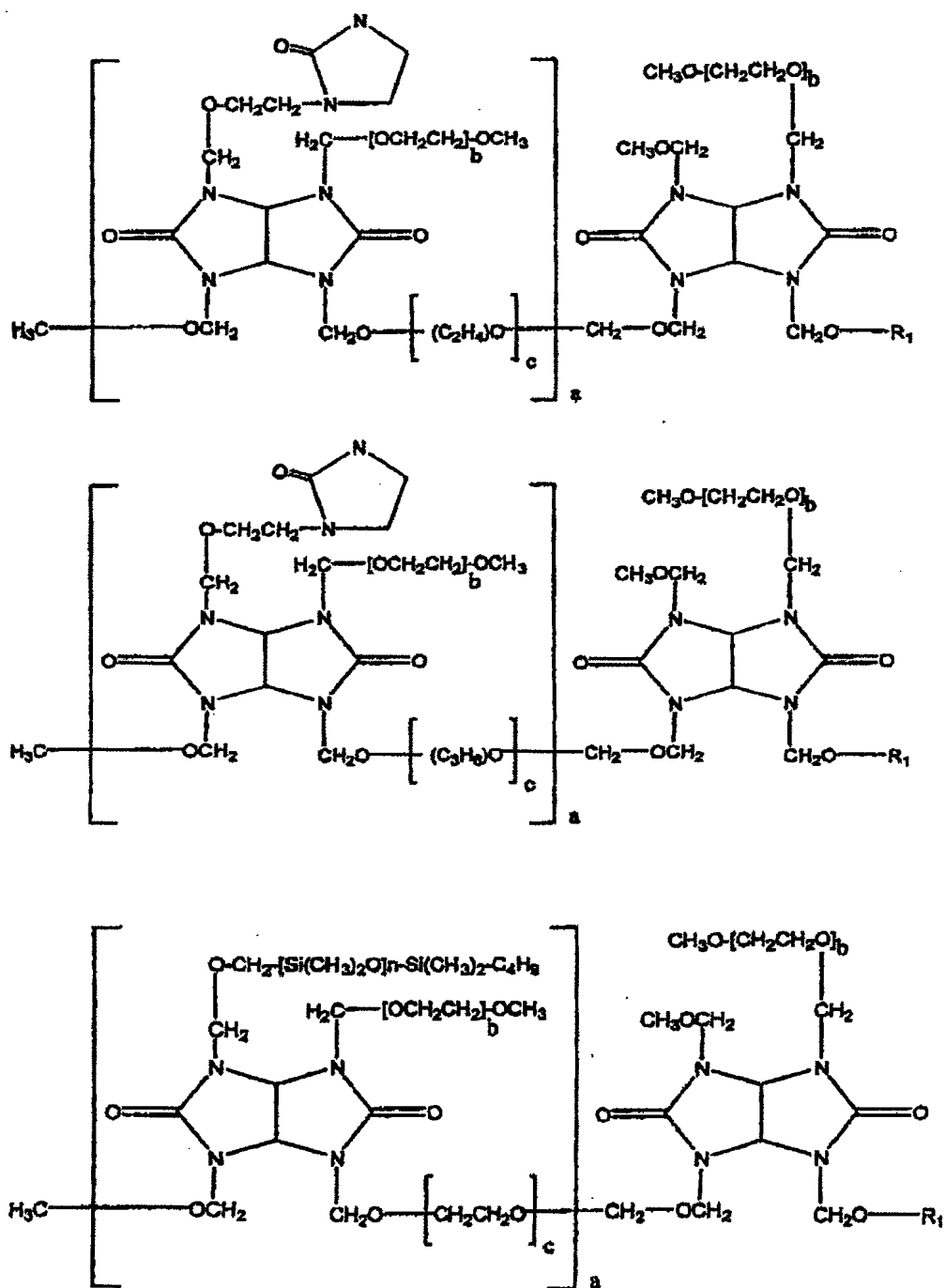


Fig. 2.3

